REMARKS

Favorable reconsideration is respectfully requested in view of the foregoing amendments and the following remarks.

I. CLAIM STATUS & AMENDMENTS

Claims 1-23 were pending in this application when last examined. Claims 15-17 have been withdrawn as being drawn to a non-elected invention. Claims 1-14 and 18-23 have been examined on the merits, and stand rejected.

The present amendment amends claims 1, 2, 7-12, 14, 18, and 19. The present amendment also cancels claims 3, 13, and 20 without prejudice or disclaimer. Applicants reserve the right to file a continuation or division application on any canceled subject matter.

Claims 1, 2, 4-12, 14-19, and 21-23 will be pending upon entry of the present amendment.

Claims 1, 2, 7-12, 18, and 19 have been amended to recite "alloy thick film" and "laser abrasion" instead of "alloy layer" and "physical deposition." Support for these amendments can be found in the Specification, for example, at page 5, line 30, page 6, lines 13-22, and in the claims as originally filed.

Support for the amendment to claim 14 can be found in original claims 12 and 14.

The Title has been amended as suggested by the Examiner at page 2 of the Office Action. Support for this amendment can be found in the Specification, for example, at page 4, line 31 to page 5, line 1.

Applicants herein provide an attachment sheet of drawings (Figs. 1 and 2) with corrections as suggested by the Examiner at page 3 of the Office Action. Amended Figure 2 now complies with the Examiners requirement to show the laser beam focusing on the target (instead of the substrate) for abrasion as described in the Specification at page 7, lines 22-23. Figure 1 has been amended to delete a symbol as suggested by the Examiner.

Therefore, no new matter has been added by this amendment.

II. OBJECTION TO THE SPECIFICATION

Applicants have amended the Title as suggested by the Examiner, thereby obviating the Examiner's concern.

III. REJECTION UNDER 35 U.S.C. § 101 (CLAIMS 13 AND 14)

Claims 13 and 14 stand rejected under 35 U.S.C. § 101, as being identical claims. See Office Action, page 3.

Claim 13 has been canceled without prejudice or disclaimer, thereby obviating this rejection.

IV. REJECTION UNDER 35 U.S.C. § 102(B) (CLAIMS 1, 2, AND 8)

Claims 1, 2, and 8 have been rejected under 35 U.S.C. § 102(b) as allegedly anticipated by Mikio et al., JP 09-237714 ("Mikio"). Applicants respectfully traverse this rejection for the following reasons.

Mikio fails to anticipate the claimed invention because the reference fails to teach a **thick film magnet**, physical deposition by **laser abrasion**, **lamination of thick films**, and a **degree of vacuum of 10^{-6} Torr or less**.

To anticipate a claim, a single prior art reference must teach, either expressly or inherently, each and every element of the claimed invention.

In the instant case, the claims of the present invention call for a method for manufacturing a rare earth **thick film magnet** of 30 to 100 μm in thickness. By contrast, Mikio discloses a **thin film magnet** for use in motors or magnetic appliances. Moreover, the "thin film magnet" of Mikio and the "thick film magnet" of the present invention are completely different compositions differing in material characteristics, manufacturing processes, and in production costs.

As evidence that a "thin film magnet" and a "thick film magnet" are different compositions, Applicants herein provide the definitions of the two types of film as commonly understood by those in the technical field, and as as set forth in the attached copy of the McGraw-Hill Dictionary of Scientific and Technical Terms, 6th Ed. In this regard, the phrase "thin film" is defined as a film that is a few molecules thick film and is deposited on a substrate to form a capacitor, resistor, coil, cryotron, or other circuit component. In other words, a film having a thickness of from 0.01-1.0 μm is a "thin film." By contrast, the "thick film magnet" of the present invention has a thickness of 30 to 100 μm and would never be considered a "thin film magnet".

The thickness of the thin film disclosed in Mikio is 0.02 μm (200 Å) Nd-Fe-B and 0.02 μm Fe. Neither the thickness of the thin film nor the thickness of the laminated thin film made by laminating a plurality of the repeating unit disclosed in Mikio is thick enough to obtain the sufficient magnetic characteristics as disclosed in the "Background of the Invention" of the present invention which characteristics result from the present method and are present in the claimed motor.

In addition, Mikio fails to teach physical deposition by **laser abrasion**. Also, the deposition rate for "thin films" is conventionally 0.1-4 μm/hr. Given such a slow deposition rate, production costs for conventional thin film process would increase drastically to obtain a sufficient thickness of 30-100 μm, such as disclosed that in the present invention. As discussed in the Specification, the present invention aims to provide a less expensive method to form a high performance magnetic film. In this regard, the "thick film magnet" of the present invention is obtained by the method called "laser abrasion" and the deposition rate is very high compared with the conventional thin film process.

Claim 2 also calls for **laminating a plurality of thick films**. Mikio does not teach this. As discussed above, Mikio fails to disclose thick films. Instead, Mikio discloses the lamination of thin films, not thick films.

Finally, claim 8 calls for a **degree of vacuum of 10^{-6} Torr or less**. Mikio also fails to disclose this. Instead, Mikio discloses a degree of vacuum of 8 x10 to 1 Pa at the time of deposition which is equivalent to 0.060 to 0.005 Torr. Before the deposition, the chamber is first evacuated to 8 x10^{-4} Pa and then Ar gas is introduced to the chamber to perform the deposition at the above-described vacuum range.

In sum, Mikio fails to disclose a thick film magnet, the lamination of thick films, and a degree of vacuum of 10^{-6} Torr or less. Consequently, Mikio fails to teach and/or suggest each and every element of the claimed invention. Accordingly, the rejection of claims 1, 2, and 8 under 35 U.S.C. § 102(b) is untenable and should be withdrawn.

V. REJECTIONS UNDER 35 U.S.C. § 103

A. Mikio in view of Araki (claims 3, 4, and 7)

Claims 3, 4, and 7 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Mikio in view of Araki et al., U.S. Patent No. 5,676,998 ("Araki"). See Office Action,

pages 5-6. Applicants respectfully traverse this rejection for the reasons noted above with regard to Mikio and for the reasons set forth below.

To establish obviousness, three criteria must be met. First, the prior art references must teach or suggest each and every element of the claimed invention. Second, there must be some suggestion or motivation in the references to either modify or combine the reference teachings to arrive at the claimed invention. Third, the prior art must provide a reasonable expectation of success.

In the instant case, the claims of the present invention call for a method for manufacturing a rare earth **thick film magnet** of 30 to 100 μm in thickness and a **film-formation speed of 50 μm/hr or more**. The cited references fail to teach and/or suggest these claimed elements.

First, as discussed above, the primary reference, Mikio, discloses a thin film magnet, not a thick film. Araki fails to remedy this deficiency because it does not teach a thick film magnet.

Second, even though Araki is relied upon as disclosing laser abrasion, Araki only exemplifies the method as one film formation method. Araki also fails to provide a precise explanation of the laser abrasion process.

Third, Araki discloses the following two "important factors" regarding their invention: (1) the substrate temperature should be kept high enough (500-630 °C) to obtain a sufficient crystallization, even in a case where the film is post heat-treated (Araki, column 7, lines 33-37); and (2) the deposition rate should be less than 40 μm/hr (Araki, column 8, lines 25-29 and Table 2). By contrast, in the present invention, substrate heating is not necessary. Moreover, the deposition rate in the claimed invention is 50 μm/hr or more. Clearly, Araki's disclosure of a deposition rate of less than 40 μm/hr **teaches away** from the claimed deposition rate. It is well established that a teaching away is indicative of non-obviousness.

Thus, Mikio, alone or combined with Araki, fails to teach and/or suggest each and every element of the claimed invention. Furthermore, there is no suggestion and/or motivation in either reference to combine the teachings of the two references to arrive at the claimed invention. Thus, Mikio and Araki cannot render the claimed invention obvious. Therefore, the rejection of claims 3, 4, and 7 under 35 U.S.C. § 103(a) is untenable and should be withdrawn.

B. Mikio (claims 9 to 12)

Claims 9-12 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Mikio. See Office Action, pages 6-7. Applicants respectfully traverse this rejection for the reasons noted above and for the reasons set forth below.

The claims of the present invention call for a method for manufacturing a rare earth **thick film magnet** of 30 to 100 μm in thickness which includes **heat-treating at 650°-750°C** with a coercive force of 6 kOe or more, **directly applying an electric current**, **directional pressing** of the film, and **smoothing of the thick film**. The cited reference fails to teach and/or suggest these claimed elements.

Again, Mikio fails to disclose a thick film magnet. Mikio also fails to disclose laser abrasion. For these reasons alone, Mikio cannot render the claimed invention unpatentable.

Also, Mikio never discloses a pressing of the thin film magnet, direct electrical heating of the film nor smoothing of the film surface. In this regard, Figure 1 of Mikio only depicts a schematic enlarged sectional view of the thin film formed on the substrate.

Thus, Mikio fails to teach and/or suggest each and every element of the claimed invention. Furthermore, there is no suggestion and/or motivation to combine the reference teachings to arrive at the claimed invention. Thus, Mikio cannot render the claimed invention obvious. Therefore, the rejection of claims 9-12 under 35 U.S.C. § 103(a) is untenable and should be withdrawn.

C. Mikio (claims 13 and 14)

Claims 13 and 14 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Mikio. See Office Action, page 7. Applicants respectfully traverse this rejection for the reasons noted above and for the reasons set forth below.

Claim 13 has been canceled. Claim 14 calls for a method of manufacturing a rare earth **thick film magnet** which includes applying direct electric current to a plurality of laminated allow thick films, **heat-treating at higher than 9°C/sec**, at a pressure of 200-400 kgf/cm^2 at a degree of vacuum of 1 Torr or less. The cited reference fails to teach and/or suggest these claimed elements.

Again, Mikio fails to disclose a thick film magnet. Nor does Mikio teach laser abrasion. For these reasons alone, Mikio cannot render the claimed invention unpatentable.

Mikio also fails to disclose the specifically claimed high speed heat-treatment of the present invention.

Thus, Mikio fails to teach and/or suggest each and every element of the claimed invention. Furthermore, there is no suggestion and/or motivation to combine the reference teachings to arrive at the claimed invention. Thus, Mikio cannot render the claimed invention obvious. Therefore, the rejection of claims 13 and 14 under 35 U.S.C. § 103(a) is untenable and should be withdrawn.

D. Mikio in view of Araki, and Akioka (claims 5 and 6)

Claims 5 and 6 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Mikio in view of Araki, and further in view of Akioka, U.S. Patent No. 5,597,425 ("Akioka"). See Office Action, page 8. Applicants respectfully traverse this rejection for the reasons noted above with regard to Mikio and for the reasons set forth below.

The claims call for a method for manufacturing a rare earth **thick film magnet** wherein the substrate includes tantalum or ion-implanted tantalum on a surface. Again, Mikio and Araki fail to disclose a thick film magnet. For this reason alone, these references cannot render the claimed invention unpatentable. Akioka also fails to remedy this deficiency.

Thus, Mikio, Araki, and Akioka fail to teach and/or suggest each and every element of the claimed invention. Furthermore, there is no suggestion and/or motivation to combine the reference teachings to arrive at the claimed invention. Thus, the cited references cannot render the claimed invention obvious. Therefore, the rejection of claims 5 and 6 under 35 U.S.C. § 103(a) is untenable and should be withdrawn.

E. Mikio in view of Bell (claims 18 and 19)

Claims 18 and 19 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Mikio in view of Bell et al., U.S. Patent No. 5,682,670 ("Bell"). See Office Action, page 8. Applicants again respectfully traverse this rejection for the reasons noted above with regard to Mikio and for the reasons set forth below.

The claims call for a method of manufacturing a rare earth **thick film magnet** comprising deposition by **laser abrasion** and a substrate that includes tantalum on ion-implanted tantalum on a surface. Again, Mikio fails to disclose a thick film magnet. Applicants again reiterate the arguments regarding Mikio. Bell fails to remedy this deficiency.

Thus, Mikio and Bell fail to teach and/or suggest each and every element of the claimed invention. Furthermore, there is no suggestion and/or motivation to combine the reference teachings to arrive at the claimed invention. Thus, the cited references cannot render the claimed invention obvious. Therefore, the rejection of claims 18 and 19 under 35 U.S.C. § 103(a) is untenable and should be withdrawn.

F. Mikio in view of Bell and Araki (claims 20 and 21)

Claims 20 and 21 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Mikio in view of Bell and Araki. See Office Action, pages 9-10. Applicants again respectfully traverse this rejection for the reasons noted above with regard to Mikio, Araki, and Bell.

Claim 20 has been canceled. Claim 21 calls for a method for manufacturing a rare earth **thick film magnet** wherein the substrate is made of iron. The deficiencies of Mikio, Araki, and Bell have been discussed above and are reiterated herein. These references fail to disclose a thick film magnet.

Thus, the cited references fail to teach and/or suggest each and every element of the claimed invention. Furthermore, there is no suggestion and/or motivation to combine the reference teachings to arrive at the claimed invention. Thus, cited references cannot render the claimed invention obvious. Therefore, the rejection of claim 21 under 35 U.S.C. § 103(a) is untenable and should be withdrawn.

G. Mikio in view of Bell and Araki (claims 22 and 23)

Claims 22 and 23 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Mikio in view of Bell and Akioka. See Office Action, pages 10-11. Applicants again respectfully traverse this rejection for the reasons noted above with regard to Mikio, Bell, and Akioka.

The claimed invention calls for a method for manufacturing a rare earth **thick film magnet** wherein the substrate includes tantalum. The deficiencies of Mikio, Bell, and Akioka have been discussed above and are reiterated here. These references fail to disclose a thick film magnet.

Thus, the cited references fail to teach and/or suggest each and every element of the claimed invention. Furthermore, there is no suggestion and/or motivation to combine the reference teachings to arrive at the claimed invention. Thus, the cited references cannot render

the claimed invention obvious. Therefore, the rejection of claim 22 and 23 under 35 U.S.C. § 103(a) is untenable and should be withdrawn.

CONCLUSION

In view of the foregoing amendments and remarks, Applicants submit that the present application is in condition for allowance and notice to that effect is hereby requested.

If it is determined that the application is not in condition for allowance, the Examiner is invited to telephone the undersigned attorney at the number below to expedite prosecution of the present application.

Respectfully submitted,

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ATTACHMENT TO AMENDMENT AND REPLY

Copy of page 2139 of the McGraw-Hill Dictionary

McGRAW-HILL DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS

Sixth Edition

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松下IS

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New York Chicago San Francisco
Lisbon London Madrid Mexico City
Milan New Delhi San Juan Seoul Singapore Sydney Toronto

thick-thin chart *See* isentropic thickness chart. { 'thik 'thin ˌchärt }

thief [PETRO ENG] In the petroleum industry, a device that permits the taking of samples from a predetermined location in the liquid body to be sampled. { 'thēf }

Thiele coordinates [CHEM ENG] A graphical method for calculating the solvent-free composition of two components being separated by solvent extraction. { 'tēl·ə kō,ord·ən·əts }

Thiele-Geddes method [CHEM ENG] A method for the prediction of the product distribution from a multicomponent distillation system. { 'tēl·ə 'ged·əs ˌmeth·əd }

Thiele melting-point apparatus [ANALY CHEM] A stirred, specially shaped test-tube device used for the determination of the melting point of a crystalline chemical. { 'tēl·ə 'melt·iŋ ˌpȯint ˌap·ə,rad·əs }

Thiessen polygon method [METEOROL] A method of assigning areal significance to point rainfall values: perpendicular bisectors are constructed to the lines joining each measuring station with those immediately surrounding it; the bisectors form a series of polygons, each polygon containing one station; the value of precipitation measured at a station is assigned to the whole area covered by the enclosing polygon. { 'tē·sən 'päl·i,gän ˌmeth·əd }

thigh [ANAT] The upper part of the leg, from the pelvis to the knee. { thī }

thigh circumference [ANTHRO] The measurement around the thigh of the left leg midway between the crotch and the knee when the subject is in a standing position. { 'thī sər,kəm·frəns }

thigmotaxis *See* stereotaxis. { ˌthig·məˈtak·səs }

Thigmotrichida [INV ZOO] An order of ciliated protozoans in the subclass Holotrichia. { ˌthig·mōˈtrik·əd·ə }

thigmotropism *See* stereotropism. { thigˈmäˌträˌpiz·əm }

thill *See* underclay. { thil }

thimble [COMPUT SCI] A cone-shaped, rotating printing element on an impact printer having character slugs around the perimeter and a hammer that drives the appropriate slug forward to print the impression on paper. { 'thim·bəl }

thimble ionization chamber [NUCLEO] A small cylindrical or spherical ionization chamber, usually with walls made of organic material or air walls. { ˌthim·bəl ˌī·ə·nəˈzā·shən ˌchām·bər }

thimerosal [ORG CHEM] $C_9H_9HgNaO_2S$ The sodium salt of ethyl mercury thiosalicylic acid used medicinally as an antimicrobial agent. Also known as merthiolate. { thiˈmer·əˌsal }

thin [METEOROL] In aviation weather observations, the description-of-a-sky-cover-that-is-predominantly-transparent. { thin }

thin-bedded [GEOL] Pertaining to a sedimentary bed that ranges in thickness from 2 inches to 2 feet (5 to 60 centimeters). { 'thin ˌbed·əd }

thin disk [ASTRON] The youngest component of the galactic stellar population, still actively forming massive stars from molecular clouds and confined to within about 350 parsecs (1100 light-years) of the galactic plane. { 'thin 'disk }

thin film [ELECTR] A film a few molecules thick deposited on a glass, ceramic, or semiconductor substrate to form a capacitor, resistor, coil, cryotron, or other circuit component. [MATER] A film of a material from one to several hundred molecules thick deposited on a solid substrate such as glass or ceramic or as a layer on a supporting liquid. { 'thin 'film }

thin-film capacitor [ELEC] A capacitor that can be constructed by evaporation of conductor and dielectric films in sequence on a substrate; silicon monoxide is generally used as the dielectric. { 'thin ¦film kəˈpas·əd·ər }

thin-film circuit [ELECTR] A circuit in which the passive components and conductors are produced as films on a substrate by evaporation or sputtering; active components may be similarly produced or mounted separately. { 'thin ¦film 'sər·kət }

thin-film cryotron [ELECTR] A cryotron in which the transition from superconducting to normal resistivity of a thin film of tin or indium, serving as a gate, is controlled by current in a film of lead that crosses and is insulated from the gate. { 'thin ¦film 'krī·əˌträn }

thin-film ferrite coil [ELECTROMAG] An inductor made by depositing a thin flat spiral of gold or other conducting metal on a ferrite substrate. { 'thin ¦film 'feˌrīt 'kȯil }

thin-film field-emitter cathode [ELECTR] A sharply pointed microminiature electron field emitter with an integral low-voltage extraction gate. { ¦thin ˌfilm ¦fēld iˌmid·ər 'kathˌōd }

thin-film integrated circuit [ELECTR] An integrated circuit consisting entirely of thin films deposited in a patterned relationship on a substrate. { 'thin ¦film 'int·əˌgrād·əd 'sər·kət }

thin-film material [ELECTR] A material that can be deposited as a thin film in a desired pattern by a variety of chemical, mechanical, or high-vacuum evaporation techniques. { 'thin ¦film məˈtir·ē·əl }

thin-film memory *See* thin-film storage. { 'thin ¦film 'memˌrē }

thin-film resistor [ELEC] A fixed resistor whose resistance element is a metal, alloy, carbon, or other film having a thickness of about 0.000001 inch (25 nanometers). { 'thin ¦film riˈzis·tər }

thin-film semiconductor [ELECTR] Semiconductor produced by the deposition of an appropriate single-crystal layer on a suitable insulator. { 'thin ¦film 'sem·i·kənˌdək·tər }

thin-film solar cell [ELECTR] A solar cell in which a thin film of gallium arsenide, cadmium sulfide, or other semiconductor material is evaporated on a thin, flexible metal or plastic substrate; the rather low efficiency (about 2%) is compensated by the flexibility and light weight, making these cells attractive as power sources for spacecraft. { 'thin ¦film 'sō·lər 'sel }

thin-film storage [COMPUT SCI] A high-speed storage device that is fabricated by depositing layers, one molecule thick, of various materials which, after etching, provide microscopic circuits which can move and store data in small amounts of time. Also known as thin-film memory. { 'thin ¦film 'stȯr·ij }

thin-film transducer [SOLID STATE] A film a few molecules thick, usually consisting of cadmium sulfide, evaporated on a crystal substrate, used to convert microwave radiation into hypersonic sound waves in the crystal. { 'thin ¦film tranzˈdü·sər }

thin-film transistor [ELECTR] A field-effect transistor constructed entirely by thin-film techniques, for use in thin-film circuits. Abbreviated TFT. { 'thin ¦film tranˈzis·tər }

think time [COMPUT SCI] Idle time between time intervals in which transmission takes place in a real-time system. { 'thiŋk ˌtīm }

thin-layer chromatography [ANALY CHEM] Chromatographing on thin layers of adsorbents rather than in columns; adsorbent can be alumina, silica gel, silicates, charcoals, or cellulose. { 'thin ¦lā·ər ˌkrō·məˈtäg·rə·fē }

thin lens [OPTICS] A lens whose thickness is small enough to be neglected in calculations of such quantities as object distance, image distance, and magnification. { 'thin 'lenz }

thin list *See* loose list. { 'thin 'list }

thinner [MATER] A liquid used to thin paint, varnish, cement, or other material to a desired consistency. { 'thin·ər }

Thinocoridae [VERT ZOO] The seed snipes, family of South American birds in the order Charadriiformes. { ˌthin·əˈkȯr·əˌdē }

thin-out [GEOL] Gradual thinning of a stratum, vein, or other body of rock until the upper and lower surfaces meet and the rock disappears. { 'thinˈaůt }

thin-plate orifice [ENG] A thin-metal orifice sheet used in fluid-flow measurement in fluid conduits by means of differential pressure drop across the orifice. { 'thin ¦plāt 'ȯr·ə·fəs }

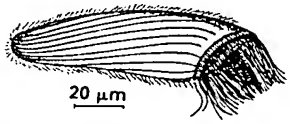
thin section [GEOL] A piece of rock or mineral specifically prepared to study its optical properties; the sample is ground to 0.03-millimeter thickness, then polished and placed between two microscope slides. Also known as section. { 'thin 'sek·shən }

thin-skinned structure [GEOL] Any large-scale structure, such as a fold or fault, confined to and originating within a thin layer of rocks above a surface of décollement. { 'thin ¦skind 'strək·chər }

thio- [CHEM] A chemical prefix derived from the Greek *theion*, meaning sulfur; indicates the replacement of an oxygen in an acid radical by sulfur with a negative valence of 2. { 'thī·ō }

thioacetamide [ORG CHEM] C_2H_5NS A crystalline compound with a melting point of 113–114°C; soluble in water and ethanol; used in laboratories in place of hydrogen sulfide. { ¦thī·ō·əˈsed·əˌmīd }

THIGMOTRICHIDA



Drawing of *Boveria*, an example of a thigmotrichid, showing ciliature.